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**Martelli, Joseph Thomas**

**THE RELATIONSHIP BETWEEN MANAGEMENT TRAINING AND OTHER  
PREDICTOR VARIABLES AND MANAGERIAL PERFORMANCE AMONG  
SELECTED INDUSTRIAL FIRST-LINE SUPERVISORS**

*University of Northern Iowa*

D.I.T. 1982

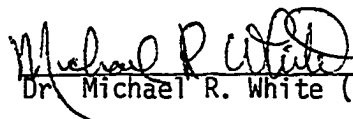
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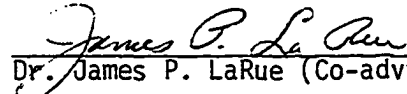


THE RELATIONSHIP BETWEEN MANAGEMENT  
TRAINING AND OTHER PREDICTOR VARIABLES  
AND MANAGERIAL PERFORMANCE AMONG SELECTED  
INDUSTRIAL FIRST-LINE SUPERVISORS

A Dissertation Submitted  
In Partial Fulfillment  
of the Requirements for the Degree of  
Doctor of Industrial Technology

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November 1981

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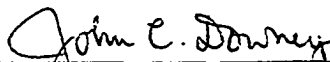
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Doctor of Industrial Technology

Approved:

  
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Dean of the Graduate College

Joseph Thomas Martelli  
University of Northern Iowa  
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### ABSTRACT

The purpose of this study was to determine whether a relationship exists between industrial first-line supervisors' participation in management training programs and subsequent job related performance as assessed by the subjects' overall management by objectives (MBO) performance appraisal rating.

Also, the relationship between managerial performance and predictor variables (age, years of supervisory experience, formal education level, self development, prior management training, and professional society involvement) was assessed.

Twenty-three first-line supervisors from a medium sized manufacturing organization participated in the study. A questionnaire was designed which extracted measures on the predictor variables from the subjects. Corporate management supplied the measure of the subjects' performance appraisal rating.

The research study was of an ex post facto design, with discriminant function analysis used as the test statistic to assess the research questions. Once the research questions were evaluated, a discriminant function was generated. The discriminant function supplied an equation which was 82.16% successful in predicting the performance on the research population.

The findings indicated:

1. There was no significant relationship between the number of management training programs attended and managerial performance.
2. There was no significant relationship between the number of

management training programs completed and managerial performance.

3. There was no significant relationship between the number of previous management training programs attended and managerial performance.

4. There was no significant relationship between years of experience within the company and managerial performance.

5. There was no significant relationship between years of managerial experience elsewhere and managerial performance.

6. There was no significant relationship between formal education level and managerial performance.

7. There was no significant relationship between age and managerial performance.

8. There was no significant relationship between participation in continuing education and managerial performance.

9. There was no significant relationship between participation in professional society activities and managerial performance.

10. There was no significant relationship between reading professional journals/periodicals and managerial performance.

## CHAPTER 1

### INTRODUCTION

#### Background of the Problem

For American business and industry to survive economically, they must have effective and successful managers (Daly, 1976; Lien, 1979). It is generally assumed that profitable corporations are contingent upon successful managers (Dyer, 1978; Flippo, 1976). Consequently, business and industry spend billions of dollars per year on training and development programs (Dyer, 1978; Kearney, 1975; Neuman & Pizam, 1978-79). One recent estimate of the amount of money spent annually by American corporations on all types of training and development was in excess of 100 billion dollars (Lien, 1979).

Even with this tremendous amount of money being spent to develop and train managers, an unanswered question remains: whether managers can in fact be "developed". Some individuals feel that managers cannot be developed, but, rather that people are born with the innate capabilities to manage. Others are confident that people can be trained to become successful managers (Campbell, Dunnette, Lawler, & Weick, 1970; Dyer, 1979; Hill, 1980; Miner, 1965).

Although a tremendous amount of money is spent attempting to develop successful managers, Campbell et al. (1970) conclude their research by stating that there is no empirical and conclusive evidence that management training and development is related to success as a manager. Recent research on the topic of the evaluation of management training and development concludes that the training



and development efforts of an organization may be negligible (Daly, 1976; Dyer, 1978; Lien, 1979; Miles & Biggs, 1979). Kearney (1975) and Sage (1973) state that much more research on the effects of management training and development activities should be conducted.

Research by Clegg (1978) found that three-fourths of the fifty companies he surveyed placed the responsibility of evaluating the effectiveness of management training in the hands of the training staff. However, Kirkpatrick (1976) states that it is obvious that training directors and training staffs seldom possess the skills and knowledge about evaluation to adequately evaluate training in a reliable and valid manner. Even in those cases where training personnel are competent in evaluating training, Clegg (1978) reports that training personnel often neglect the evaluation of training because of a perceived lack of time. Brown (1980) and Daly (1976) point out that even when the evaluation of management training is performed it frequently relies on the reactions of the trainees towards the training as the criterion of success. Ostensibly, if the trainees liked the training, it must have been worthwhile. Although trainees' reactions to training programs are obviously valuable (Rosenthal & Mezoff, 1980), actual job performance remains the crucial test in evaluating the benefits of management development (Hill, 1980; McConkey, 1974). Sullivan (1970) reinforces this idea and insists that the primary

objective of management development is to improve the performance of the trainees while they are employed by the organization.

#### Significance of the Problem

One of the most serious problems which faces industry today is that there is a serious shortage of effective and successful managers (Hersey & Blanchard, 1977; Miner, 1974; Novit, 1979). This shortage of managerial talent is predicted to continue well into the future (Miner, 1974; Novit, 1979). Furthermore, because of the complexity, competition, and expense in running successful organizations, the continued growth of management training & development is imperative (Daly, 1976).

Because enormous costs are usually associated with training and development, training personnel must be able to justify training in terms of the contribution it actually makes to the organization (Daly, 1976). If training evaluation studies fail to show a significant relationship between participation in company-sponsored training activities and trainee's job performance, the training should be revised, replaced, or discontinued (Clegg, 1978; House, Tosi, Rizzo, & Dunnick, 1967; Sage, 1973; Stein, 1981; Sullivan, 1970). Evaluation, however, remains the forgotten, misunderstood, and misused phase of the training and development process (Bunker & Cohen, 1977; Nixon, 1973; Putman, 1980; Woodington, 1980).

Nixon (1973) and Putman (1980) have said that evaluation studies which are highly scientific and performed under controlled

laboratory conditions increase the internal validity of the associated research design. However, Nixon (1973) adds that the contrived artificial settings and irrelevant criterion measures bear little resemblance to real world problems, thus decreasing external validity of the study. The use of real world settings in the evaluation of training produces results which may be confounded by extraneous variables, decreasing the internal validity of the research (Nixon, 1973; Putman, 1980).

The use of newer methods of evaluating management development is recommended by Clegg (1978). This research study determined that less than fifty percent of the evaluation strategies which could be utilized to evaluate management training and development were actually being employed.

#### Statement of the Problem

Is there a relationship between industrial first-line supervisors' participation in organizational management training programs and subsequent job related performance as assessed by the overall management by objectives (MBO) performance appraisal rating used by the organization.

#### Research Questions

The primary purpose of this research was to answer the following research questions. The .05 level of significance was used as the criterion for evaluating the statistical significance of each research question.

1. Is there a significant relationship between the number

of organizational management training programs attended and managerial performance?

2. Is there a significant relationship between the number of management training courses completed and managerial performance?

3. Is there a significant relationship between the number of management training programs attended prior to those which were taken during a manager's last performance appraisal cycle and managerial performance?

4. Is there a significant relationship between years of managerial experience within the company and managerial performance?

5. Is there a significant relationship between years of managerial experience within other organizations and managerial performance?

6. Is there a significant relationship between formal education level and managerial performance?

7. Is there a significant relationship between age and managerial performance?

8. Is there a significant relationship between taking part in work-related adult education programs and managerial performance?

9. Is there a significant relationship between taking part in continuing education and managerial performance?

10. Is there a significant relationship between taking part in correspondence study and managerial performance?

11. Is there a significant relationship between participation in professional society activities and managerial performance?

12. Is there a significant relationship between reading professional periodicals and journals and managerial performance?

#### Assumptions

The following assumptions were made in regard to this research study:

1. The MBO performance appraisal rating of each individual subject was used as the dependent variable criterion measure, and this was an operationally useful tool to the organization. Thus, it was assumed that this measure was valid and reliable.
2. Due to the biographical nature of the questionnaire, responses obtained from the subjects were assumed to be valid and reliable.
3. It was assumed that in the future, the justification for funds to conduct management training within organizations will depend more and more on proof of job performance improvement by management training participants.

#### Limitations

The following limitations were made in regard to this research study:

1. The independent variable (management training participation) is manipulable, but was not manipulated within this study. That is, the subjects had already participated in the various levels of the treatment, and were not randomly assigned to the various treatment levels with full control of experimental conditions by the researcher. Therefore, the results of this

research are not of a cause-and-effect, but associational nature. While causality cannot be inferred as a result of ex post facto research a statistically meaningful interpretation of the relationship between the independent variable(s) and the dependent variable is possible (Kleinbaum & Kupper, 1978).

2. Participation in this study by the subjects within the research population was voluntary. Twenty-three of 26 subjects agreed to participate. The three non-participants were not shown to be atypical performers.

3. The generalizability of the findings of this study is limited to the research population.

#### Delimitations

The following delimitations were made in regard to this research study:

1. Only first-line supervisors within a Fortune 700 organization were used as subjects in this study.

2. Although there may be more predictor variables related to managerial performance, only those identified in the review of the literature were investigated in this study.

#### Definition of Terms

Ex post facto research Research in which the researcher cannot directly control the independent variables because they are non-manipulable or their effects have already occurred. However, inferences about the relationships between independent and dependent variables can be made (Kerlinger, 1973).

Extraneous variables Variables which could influence the measure of the dependent variable which are not systematically accounted for in the research design or by the use of statistical techniques (Sax, 1979).

Multivariable techniques A generic term used to describe several multivariable statistical techniques such as analysis of variance, multiple discriminant function analysis, and factor analysis (Comrey, 1973). "Multivariable techniques deal with problems that involve describing the relationship between two or more variables" (Kelinbaum & Kupper, 1978, p. 1). This body of statistical knowledge is valuable in the study of the social sciences, where the interaction of variables is often unclear (Comrey, 1973).

Primacy effect "The tendency in impression formation to give initial information more weight than subsequent information" (Mischel & Mischel, 1977, p. 508).

Management training For the purpose of this study, management training refers to classes, courses or seminars given to managers intended to transmit specific job-related information. Management training is usually given to many managers in similar capacities and intended to produce an immediate work-related behavioral change among the participants (Black, 1979).

Management development Those planned and systematic activities sponsored by an organization and intended to aid in the growth and intellectual development of managers within

the organization (Black, 1979). Unlike management training, management development is more of an individual matter. Although management development is oriented toward specific goals its payoff may not be immediately experienced by an organization (Tracey, 1974). Management development encompasses activities which include classroom based instruction as well as on-the-job coaching, job rotation, job enlargement, understudy, and management retreats (Flippo, 1976).

Single blind A research method where the identity of the subjects or their respective treatment group is not known by the researcher (Woolman, 1973).

Discriminant function A discriminant function is essentially a regression (or prediction) equation where the dependent variable is discrete, as opposed to continuous. A discriminant function is generated during the classification phase of discriminant analysis and it can be useful in predicting group membership (Kerlinger & Pedhazur, 1973).

Independent variable For the purpose of this study, the independent variable is the number of company sponsored management training courses, seminars, and workshops which the subjects have participated in during their last twelve month performance appraisal cycle.

Dependent variable For the purpose of this study the dependent variable is the supervisors' current overall MBO performance appraisal rating.



Predictor variables Several predictor variables, identified in the review of the literature, were incorporated in this study. These predictor variables were: age, years of supervisory experience, formal education level, self development, prior management training experiences, and participation in professional society educational activities.

## CHAPTER 2

### REVIEW OF THE LITERATURE

Relevant literature was reviewed in the areas of the historical development of management training and development and previous research in the area of the evaluation of management training and development. It was also necessary to review past research concerning the nature of management performance appraisal. The review of the literature concludes with a discussion of the predictor variables which were included as independent variables in this study.

#### Historical Development of Training and Development

Unlike technical and skill training, management training and development is a relatively recent phenomenon in industrial organizations (Black, 1979; Steinmetz, 1976). Initially, management training took the form of supervisory and foreman training. The body of knowledge which was taught to managers at that time (circa 1917) consisted primarily of the principles of scientific management pioneered by Fredrick Taylor (1911a, 1911b), while the origin of training for top level executives evolved from the works of Henri Fayol (1916). These two men are generally credited with the development of managerial science as a body of knowledge capable of organization (Black, 1979; Tracey, 1974). The extent of training individuals in the use of this managerial body of knowledge prior to World War I was quite limited. In fact, prior to World War II, most managers developed their

skills solely through their on-the-job experiences (Houston, 1961).

Most industrialists felt little need for any type of formalized or systematic training during the years between the World Wars. During this time period the primary school of thought was that organizations could be viewed merely in terms of their function and activities (Parsons, 1949). It was felt that people were relatively unimportant in terms of the operation of an industrial organization; the minor problems that they added to organizational operations could easily be eliminated through careful engineering of the environment or initial selection (Herbert, 1976).

Recognition of the need for systematic and formal management training existed first within a few circles of progressive thinkers (Houston, 1961) such as Elton Mayo, Rensis Likert, Kurt Lewin, Mason Haire, Herbert Simon, and Richard Cyert. Those individuals, primarily working in universities, brought attention to the development of management and behavioral theory (Black, 1979).

During World War II military personnel in the United States required people with intensive and effective skills and technical training. In effect, this drew attention away from the process of training managers in management and behavioral theory. The impetus for this change was brought about by a large proportion of the male population being sent overseas to fight in the war. This phenomenon left a tremendous gap in the workforce which had to be filled by previously untrained and unemployed women. The emphasis of training in industry, therefore, was primarily

towards training these women to perform their new jobs of fulfilling the material needs of the armed forces (Steinmetz, 1976; Tickner, 1966). It was not until the post World War II years that industrial and corporate leaders began to express a need for systematic and formal training and development activities for management personnel (Black, 1979; Flipppo, 1976; Steinmetz, 1976).

Houston (1961) hypothesized that there were three basic trends occurring in society within the past 80 years which led industrialists to this conclusion. The first trend was the rate of change in society, which since the turn of the century had been accelerating astronomically. This change rate resulted in an increase in the complexity of industrial organization. Consequently, new managerial and leadership concepts had to be developed. The second trend was a growing recognition that management was a legitimate profession with a body of knowledge capable of being organized and taught to management students. The third trend was the realization that a rapidly changing society demands a commitment to life-long learning for managers. These three trends, accompanied by the success of the foreman training programs developed in the 1920's and the skills training programs that were generated in the World War II era, contributed to the growth of management training and development as a means of developing management personnel in modern industrial organizations.

The growth of management training and development is predicted to continue into the future. History has shown that there is

a need for programs of accelerated learning for managers due to the nature of change within industry and society (Houston, 1961). Societal and industrial change is also predicted to continue at an accelerated rate (Herbert, 1976; Lauda & Ryan, 1971; Toffler, 1970). The trends influencing the need for management training and development therefore, will continue well into the future. Additionally, Miner (1974) and Hersey and Blanchard (1977) predict that during the remainder of the century there will be a severe shortage of managers. Miner (1974) bases this prediction upon:

- (a) the low birthrate during the 1930's
- (b) the unprecedented expansion in the size of the average corporation in recent years,
- (c) the increasing complexity of the management process, and (d) the burgeoning demand for executive talents outside industry, notably in government and education (p. 3).

#### Evaluation of Management Training and Development

The following section reviews five studies which have been conducted on the topic of the evaluation of management training and development. These studies discuss previous attempts to evaluate management training and development and examine the research design and methodologies used for the evaluation. Also included is a review of a survey performed to examine the management training and development evaluation practices of major industrial

organizations.

In 1978, Clegg performed a longitudinal study to investigate management training and development evaluation practices in 50 randomly selected Fortune 500 companies. The major results of this study were: (a) seventy-five percent of management training evaluation was performed by the training staff, (b) the criteria used for evaluating management training ranged from actual job performance changes to simple participant reactions to the training, as well as changes in the knowledge and attitudes of the trainees, (c) less than 50% of appropriate evaluation methods available were being used to evaluate management training, (d) evaluation of management training was frequently eliminated because of obscure or spurious objectives, (e) evaluation of in-house management training was frequently neglected because the responsible individual(s) did not have enough time to allocate for performing the evaluation, and (f) a lack of standards was cited as presenting the most pressing problem and weakness in the evaluation of in-house management training.

Clegg (1978) concluded his research by stating the industrial corporations should seriously consider the evaluation of management training by individuals external to the corporation, such as private consultants or university personnel. This study also noted that additional evaluation strategies should be developed in evaluating management training.

In 1976, Beeland conducted a study to determine the effectiveness

of management training delivered in two different physical environments--in-house and off-premise. Training content was delivered by three mediums: lecture, print, and video tape. Subjects in this study were 69 first-line industrial supervisors. The content for the training program consisted of knowledge about management concepts and bureaucratic orientation. Results of this study indicated that there was no significant difference between the methods of presentation. It was also found that neither in-house nor off-premise training were effective, and that in-house training had an inverse effect upon learning. That is, in-house training brought about undesirable changes in the trainees.

Beeland (1976) used two instruments to evaluate the effectiveness of the management training program. The first criteria was based upon the subjects' performance on a cognitive test instrument measuring knowledge of management theory. The second criteria was an affective measure of bureaucratic orientation entitled the Work Environment Preference Schedule (Leonard, 1973).

Landrum (1974) conducted a study to determine the effects of a custom-tailored management training course on the managers' on-the-job performance. The superior-subordinate rating method to evaluate the on-the-job performance of the subjects was used. The rating form was developed based upon the works of Buchanan (1957) and Korb (1956). The research design used was a randomized pretest/posttest control group design. Post-training evaluation

occurred 90 days after the treatment. The results indicated that the experimental group differed significantly from the control group on 11 of the 13 job performance criterion measures. The most noticeable performance improvements of the subjects occurred in the areas of communications and human relations. Landrum (1974) concluded that participation in the custom-tailored training course resulted in significant positive improvement of the trainees' on-the-job performance.

Jurkus (1974) conducted a study where the treatment consisted of a one week university sponsored management training course presented to middle management executives from 15 different companies. A total of 69 subjects were involved in the research. Dependent variable criterion measures included a pre- and post-training evaluation of subject attitudes toward training, a pre- and post-training performance-based evaluation conducted by the subject's immediate supervisor, as well as a post-training evaluation of the course content as delivered by the instructors.

The results of Jurkus' (1974) research were that: (a) there was no significant difference between the pre- and post-measures of attitude towards training, (b) there was no significant difference between pre- and post-test supervisory performance ratings, (c) there was no significant linear relationship between pre-training attitude and pre-training supervisory performance rating, and (d) there was no significant linear relationship between post-training attitude and post-training instructor



evaluation. However, Jurkus (1974) did find a significant relationship between: (a) pre-training attitudes and the instructor's post-course evaluation, and (b) between pre- and post-training attitudes of the trainees.

Jurkus (1974) concluded his research by stating that the training course had no positive effect upon the trainees' attitudes, performance or knowledge. Jurkus stated that more scientific rigor should be included in the evaluation of management training.

Sullivan (1970) conducted a study in which it was found that the growth of management training and development in the U.S. had been significant, but that the effectiveness of that training is still somewhat doubtful. It was also indicated that no completely satisfactory method to evaluate the effectiveness of training currently exists or is widely employed.

The primary purpose of Sullivan's study was to determine how and to what extent American industries evaluate their management training. A field survey was conducted to determine what evaluation practices were being used. The conclusions of this study were: (a) the ultimate purpose of management training is to improve the on-the-job performance of trainees, and thus increase organizational effectiveness and reduce costs, (b) the relationship between training and performance is difficult to measure because a number of extraneous variables influence that relationship, (c) valid management training evaluation should incorporate multiple measures, (d) evaluation practices in

industry were narrow-minded and suffer from limited methodology, and (e) that the justification of funds for management development in the future will be difficult without improved evaluation methods to empirically assess its worth.

In conclusion, these studies suggest that the effectiveness of management training, in terms of on-the-job performance remains unclear. Some of this research has indicated that management training is successful while other literature indicates that management training exerts a negligible to inverse effect upon job performance. Therefore, participation in management training programs was included as the primary independent variable in this study.

#### Management Performance Appraisal

Performance appraisal of management personnel has occurred within organizations as long as they have existed (Chruden & Sherman, 1972; Schick, 1980). Until recently, however, the primary emphasis has been of an unsystematic, informal, and subjective analysis of an employee's performance (McConkey, 1974). Such unsystematic performance appraisal systems suffer greatly from inherent weaknesses in their approach to the appraisal process and seldom result in an accurate assessment of an individual's performance. Instead, the assessment is contaminated by value-laden and subjective judgements about an individual's personality as perceived by the evaluator (Kellogg, 1975; Lazer & Wikstrom, 1977; McConkey, 1974).

The ultimate goal of a performance appraisal system is to assess an employee's actual performance as related to the standards which have been established for the job (Jackson & Keaveny, 1980). The task of performance appraisal is easily solved in the assessment of jobs in the physical skills domain, because factors such as production rates, quality levels, and scrap rates are easily quantified (McConkey, 1974). Performance appraisal becomes more difficult in the evaluation of managerial performance given that the job of a manager is not as clear-cut and quantifiable as that of an employee who works in the physical skill areas (Carlisle, 1976; Mintzberg, 1973). The role of the manager is to see that the organizational goals are attained (Herbert, 1976). To date, however, a clearly-defined, empirically based, and effective process by which a manager can act to insure that the job will be effectively completed has not been developed (Carlisle, 1976; Herbert, 1976).

Most management theorists and practitioners refuse to profess that any one style of management is superior for all situations (Blanchard & Hersey, 1977; Carlisle, 1973; Certo, 1980; Fiedler, 1967). Instead, these theorists and practitioners suggest a contingency or situational approach to management. This approach advocates that the manner in which a situation should be handled is contingent upon the specific characteristics which have brought about that particular situation (Blanchard & Hersey, 1977; Carlisle, 1976), adding to the difficulty of

assessing managerial performance (Chruden & Sherman, 1972).

Performance appraisal systems are widely used throughout industry for assessing managers' performance (Keil, 1977; Lazer & Wikstrom, 1977). The primary purpose of the appraisal is to assess the manager's productivity or management skill. Second, the organization would like to be able to predict the future performance of an employee. Third, the organization would like to know the degree to which the employee possesses certain characteristics or leadership traits (Lazer & Wikstrom, 1977).

While there are many different forms of performance appraisal, there are specific characteristics which any performance appraisal system must possess in order to comply with psychometric principles as well as the regulations of the Equal Employment Opportunity Commission (Flipppo, 1976; Lazer & Wikstrom, 1977).

The standard requirements for insuring quality in a performance appraisal system are that the system be valid, reliable, job related, standardized, and practical (Keil, 1977; Lazer & Wikstrom, 1977). Validity refers to the degree to which a measuring instrument actually measures what it intends to measure (Green, 1975). There are four types of validity--content, construct, concurrent, and predictive--each of which focuses on a different concern (Adams, 1964). Content validity is most important in an instrument designed to estimate a manager's productivity or managerial skill (Lazer & Wikstrom, 1977). A performance appraisal system is said to possess content validity if it contains an adequate

or representative sample of what is ultimately being measured (Lazer & Wikstrom, 1977). In a well designed performance appraisal system, the job content should be determined by those who are familiar with the job (Lazer & Wikstrom, 1977).

Reliability is a measure which concerns itself with the consistency of a measurement (Adams, 1964; Gronlund, 1976). There are a number of factors which affect the reliability of performance appraisal instruments. The most common factors are: (a) personal bias or prejudice of the rater towards the ratee, (b) recent performance taking precedence over the primacy effect, and (c) the rater's attitude at the time the appraisal is conducted (Lazer & Wikstrom, 1977).

Job relatedness is another factor which any quality performance appraisal system must possess (Lazer & Wikstrom, 1977). One of the most difficult problems in the construction of a performance appraisal system lies in determining the criterion measures which will be used in assessing the individual's job performance (Chruden & Sherman, 1972; Lazer & Wikstrom, 1977; Miner, 1965). It is essential that a performance appraisal be based upon those duties and tasks which are part of the responsibility of the worker (Harrell, 1961; Jackson & Keaveny, 1980; Lazer & Wikstrom, 1977).

A performance appraisal system should also be standardized (Keil, 1977; Lazer & Wikstrom, 1977). That is, the procedures as well as the administration of the system must be uniform

throughout the organization. Any unusual notations or terms used within the system must be clearly defined to avoid different interpretations among individuals (Adams, 1964; Keil, 1977; Lazer & Wikstrom, 1977). Frequently, companies provide training courses to their managers who are responsible for implementing a performance appraisal system. These training courses are intended to instruct those managers to implement the performance appraisal system to their subordinates in a standardized and reliable manner (Flipppo, 1976; Lazer & Wikstrom, 1977).

Finally, the performance appraisal system should be practical and useable (Green, 1975). The system must not be too difficult or cumbersome to be utilized, it must allow for measurement without being obtrusive, too time consuming or too complex to administer (Adams, 1964; Lazer & Wikstrom, 1977).

Categories of performance appraisal. There are essentially three categories into which all types of performance appraisal systems may be classified (Flipppo, 1976). The first is an informal, unsystematic, and rather casual approach. Until recently approaches falling into this category were the most frequently used in organizations (Flipppo, 1976; Lazer & Wikstrom, 1977). Since the 1960's most large corporations have abandoned informal performance appraisal systems and have adopted either a traditional or a goal setting system for evaluating their managers' performance (Lazer & Wikstrom, 1977).

The second category of performance appraisal may be classified

as the traditional approach. The traditional approach is highly systematic and structured. Basically, it attempts to classify an individual's behavior upon a series of traits that are ostensibly related to successful job performance. There are several different methods used to assess managerial performance within the traditional category. The principal difference between the types of traditional systems is in the technique used to classify and rate the employee's behavior. Some of these traditional systems include the ranking technique, person to person comparisons, graphic rating scales, checklists, forced choice, critical incident, and the paired comparison method (Chruden & Sherman, 1972; Flipppo, 1976). Each of these traditional systems has its own advantages and disadvantages. The development of these systems evolved from a need to improve the reliability and validity of the previously-used casual approach to performance appraisal. As these traditional systems were employed, individuals discovered flaws within them and consequently developed new systems to improve the older ones (Lazer & Wikstrom, 1977).

The third category of performance appraisal can be classified as a management by objectives (or goal setting) approach to performance appraisal. Management by objectives (MBO) is one of the most recently developed systems for appraising management performance (Carlisle, 1976; Flipppo, 1976; Ordiorne, 1976). Peter Drucker and Douglas McGregor are considered to be the individuals who conceptualized MBO (Carlisle, 1976; Chruden &

Sherman, 1972) while George Ordiorne and Edward Schleh are credited with making the MBO movement popular in the early 1960's (Carlisle, 1976).

The MBO approach to performance appraisal is considered to be superior to the other performance appraisal methods (Flippo, 1976; Schick, 1980; Teel, 1980). The primary criticisms of the traditional appraisal systems were: (a) there was a lack of interaction between superior and subordinate regarding the appraisal, and that the subordinate was unaware of the evaluation process and its objectives, and (b) that the traditional performance appraisal systems were lacking immensely in their reliability and validity (Flippo, 1976).

The MBO approach, unlike the previously mentioned performance appraisal systems is based upon mutually agreed upon goals established by a manager and his immediate supervisor. Unlike the other performance appraisal systems, the person being evaluated takes part in the entire performance appraisal process (Carlisle, 1976; Chruden, 1972; Flippo, 1976). In MBO, ratees are fully aware of the criteria to be used in evaluating their performance and they have actually participated in establishing their expected level of performance (Herbert, 1976).

The MBO process. MBO is a generic term which describes many types of performance appraisal systems. MBO must be tailored to fit the needs of a specific organization. There are several underlying assumptions which need to be met in order for a performance



appraisal system to meet the requirements of an MBO system. These assumptions can be validated by following five basic steps in implementing an MBO performance appraisal system (Lazer & Wikstrom, 1977).

The first step in implementing an MBO program is in defining the job of the individual. In this stage the superior and subordinate independently write a brief description of their perception of the subordinate's job, including what tasks and responsibilities are a part of that job. Once this has been accomplished both parties mutually discuss their assessment of the subordinate's job. Any discrepancies between the superior and subordinate should be discussed and remedied.

The second step involves the superior and subordinate independently listing areas of strengths and weaknesses in the subordinate's job performance. The two individuals should then discuss their lists. The result of this step should be that the superior and subordinate reach an agreement regarding the subordinate's strengths and weaknesses.

The third step in the MBO process is the actual setting of work objectives. The objectives should be based upon and reflect the results of step one, in which the superior and subordinate established the duties and responsibilities of the job. In addition to setting the objectives, the superior and subordinate should determine and mutually agree upon the performance standard for each objective.

The fourth step involves the supervisor and subordinate holding frequent review sessions during the year. These review sessions are intended to insure that progress is being made by the subordinate in terms of the accomplishment of his or her objectives and to provide performance feedback to the subordinate.

The fifth and last step in the MBO process is a year-end appraisal interview. The nature of this interview should be characterized by empathy, mutual respect and equality. The subordinate and superior should discuss the subordinate's progress in accomplishing the predetermined objectives. The manager can then make an assessment of the subordinate's overall performance. The entire MBO process typically operates on a yearly cycle (Carlisle, 1976; Flipppo, 1976; Herbert, 1976).

Unless the MBO system is properly used in a consistent manner its usefulness becomes negligible (Lazer & Wikstrom, 1977). Most companies try to insure that their MBO system is properly implemented by training their managers in the correct use of the system (Flipppo, 1976; Lazer & Wikstrom, 1977). The purpose of the training session should be to teach the raters about the philosophy of the performance appraisal system, instruct them on how to implement the system, and to make the raters aware of common errors which affect the reliability, validity and overall effectiveness of the MBO system (Flipppo, 1976; Jackson & Keaveny, 1980; Lazer & Wikstrom, 1977).

Discussion of the predictor variables. In addition to the participation in management training and development activities the review of the literature revealed several other variables which can be related to an individual's performance as a manager.

The achieved level of formal education has been shown to be a factor related to the success of managers. Bassett (1974) indicates that the acquisition of multiple degrees by an individual, as well as a post-graduate or advanced degree, may be used as a method of screening potential management personnel. Herbert (1977) performed a study to determine if managers with a Master's of Business Administration (MBA) degree were better performers than non-MBA managers. To evaluate job performance, Herbert (1977) used a self-developed rating instrument in which supervisors were asked to rate the on-the-job performance of their subordinates who held the degree of MBA. His study concluded that those managers holding the MBA tend to be rated as better managers than non-MBA managers. A total of 129 MBA's employed by twenty-seven organizations in the manufacturing and service industries served as subjects.

Miner (1965), stated that the level of formal education achieved by the manager was significantly related to managerial success. Dean (1976) concluded that management trainees who held college degrees performed better in management training than trainees who did not hold college degrees. However,

Livingston (1971) states that the effectiveness of a manager cannot be determined by the nature or number of degrees which a manager holds.

The number of years of managerial experience has also been shown to be related to managerial success ('Street-smart', 1979). Management recruiters often report that their industrial and corporate clients were instructing recruiters to send for interviews only potential managers who had several years of actual managerial experience, rather than more recent college graduates with little or no managerial experience.

Carlisle (1976) discusses management as being both an art and a science. He concluded that those aspects of management which are scientific can be learned through training, development, and educational experiences. However, he also stated that the application of that science remains an art and is only learned through experience.

Taylor (1975) conducted research on the relationship between age and experience on managerial information processing and decision-making performance. Seventy-nine managers in a heavy manufacturing industry were studied ranging from foremen to plant managers. Taylor found that the number of years of managerial experience was positively correlated with a manager's ability to accurately judge the value of information, the amount of time required to reach decisions, and how flexible were the decisions.

Another variable found to be associated with the success

of managers was age (Birren, 1964; Kirchner, 1958; Miner, 1974). In the previously mentioned study by Taylor (1975), age was also used as an independent variable. Taylor's results on the variable of age indicated that older managers have some difficulty in processing and integrating information into accurate decisions. However, he also found that older managers were able to diagnose the value of information more accurately than the younger managers. Also, while older managers were found to have less confidence in their decisions, they were more flexible in altering those decisions as a result of adverse consequences resulting from their original choice (Taylor, 1975). Overall, Taylor reported that age was the most positive and influential factor on performance in the decision-making exercises of the experiment.

Barkin (1970), Brennan (1974), and Weatherbee (1969) have conducted research on the relationship between age and worker productivity. Their findings suggested that older employees may have trouble working at a fast pace, but that older workers yield a more stable output. Older employees were found to have a higher level of overall productivity as compared to younger workers, especially when productivity was not a function of physical strength. Thus, in managerial work, where physical strength is not as important as mental capabilities, age appeared to be positively related to managerial productivity.

Self development has also been shown to be a significant factor which has been perceived to be related to managerial

success. Pearse (1974) conducted a study of over 2,000 managers employed in organizations of size ranging from under 50 employees to over 10,000 employees. These managers ranked self study/self development as the second most important factor responsible for development of their management skills. The managers ranked only their experience as being more important than their own efforts at acquiring managerial skills.

The demand for self development and self study is reflected by the increased demand for continuing education within the country (Erdos, 1967). Adults are pursuing education throughout their life for a number of reasons. Some individuals attempt to extend their general education for personal enrichment. Others attempt to expand their skill and knowledge in areas associated with their profession for potential advancement (Erdos, 1967; MacKenzie, Christensen, & Rigby, 1968). Many people participate in self development activities merely to become more competent at performing their current job (Desatnick, 1970).

Self development/self study is a broad term and can be facilitated in several ways. Self development/self study may be achieved through participation in organized continuing education programs offered throughout the country (as mandated by the Lifetime Learning Act of 1976), through participation in professional societies, or through other individual activities such as reading books and periodicals pertaining to one's profession (Houle, 1980; Lee, 1966; Vermilye, 1977).

In conclusion, the literature indicates that formal education level, the number of years of supervisory experience, age, and self development are factors which have been shown to be related to successful performance as a manager. As a result of the identification of these predictor variables, a questionnaire designed to elicit and measure these variables from the subjects was developed. Thus, these predictor variables were incorporated within this study as independent variables.

## CHAPTER 3

### METHODS AND PROCEDURES

#### Introduction

This study was classified as a relational study of an ex post facto design (Sax, 1979). One of the benefits of this type of design is that comparisons and relationships from existing data can be made (Galfo & Miller, 1970). The basic difference between ex post facto and experimental research is that in the latter, the experimenter has full experimental control over the independent variable(s) as well as the ability to randomize subjects (Kerlinger, 1973).

Thus, this study was not classified as a classical experimental design because the subjects of this study were not randomly assigned in respect to the independent (treatment) variable. That is, the treatment variable was manipulable, but was not manipulated due to the restrictions imposed upon the researcher through the parameters imposed by the host agency.

#### Research Population

The research population for this study consisted of all first-line supervisors within one division of a mid-west based Fortune 700 manufacturing organization. The entire research population consisted of 26 male first-line supervisors. Of those 26 supervisors 23 chose to participate in the study by completing a questionnaire (see Appendix A). Thus, the return rate on the questionnaire was 88.46%. The performance appraisals



of those three individuals not participating in the study were examined to determine if they were either extremely low or high performing managers. Such an instance could cause selectivity bias and a subsequent threat to internal validity. It was determined that all three of the non-participants had been rated a 2 (average). Thus, the participation of these three non-participants would not have significantly changed the results of this study.

#### Description and Selection of the Participating Organization

The particular plant under investigation employs approximately 500 people. The plant is located in a mid-western metropolitan area of 100,000 people. The plant in which the study took place is one of seven owned by the corporation. The entire organization employs over 5,000 individuals located at the eight plant locations and corporate headquarters.

Before this particular plant was selected for investigation, the researcher solicited four organizations for their participation in this study. The first organization contacted was a Fortune 200 organization engaged in the manufacture of construction industry equipment. The researcher was told by the organization's officer contacted that the organization was not interested in knowing the relationship between management training and job performance.

Another organization, a Fortune 50 company was interested in participating in the study. However, upon an initial investigation it was discovered that participation in training activities

could be part of an individual's MBO goal setting contract. Thus, mere participation in training activities within the organization could positively influence one's performance appraisal rating. It was also found that this practice occurred throughout the organization and occurred in an unsystematic manner. Because this phenomena would seriously affect the internal validity of the study this organization was not selected to participate in this study.

A third Fortune 200 organization involved in the transportation industry was contacted by the researcher. Initially, this company was interested in participating in the study. However, it was discovered that this organization did not have an MBO or goal setting approach to performance appraisal. Because the review of the literature indicated that an MBO or goal setting approach to performance appraisal is generally the most valid type of performance system, this company was eliminated as a possible participant in this study.

Subsequently, the participating organization was contacted and selected. Although the size of the population was relatively small compared to the other organizations, the company did have an MBO performance appraisal system in operation. Also, the performance appraisal rating was not influenced by participating in training, and selection of individuals to receive training was not necessarily based upon past performance. Also, the research population size of 23 is large enough to exceed an

assumption regarding sample size for discriminant analysis. The assumption is that the number of cases (sample size) exceed the number of independent and predictor variables by two (Klecka, 1980).

#### Data Collection

There were two primary sources for collecting all of the information required to perform this study. The first source of information was the subjects taking part in the study. A specially designed questionnaire (see Appendix A) was distributed by a representative of company management. The questionnaire was designed to extract all demographic and biographical information pertaining to the independent and the predictor variables. The questionnaire items were designed to extract the information regarding the independent and predictor variables as they were shown from the review of the literature to be related to managerial performance.

The design and development of the questionnaire evolved over a period of several months. The questionnaire had gone through several revisions before it was printed in its final form. Prior to the final printing, the questionnaire was submitted to a panel of five experts for their evaluation. Evaluation was based upon how well the questionnaire items were stated and reflective of the actual predictor variables. Suggestions made by the panel were incorporated within the questionnaire, and thus established content validity of the instrument.

Included in Appendix B is a copy of the instruction sheet

which was provided to the company representative who administered the questionnaire. The instruction sheet, along with the directions at the top of the questionnaire were provided to insure that the questionnaires be properly and uniformly completed.

The second source of information was extracted from the subjects' current performance appraisals. This source of information provided the measure of the dependent variable, and was supplied by the corporate management. A description of the performance appraisal rating is included within this chapter.

Because of legal restrictions regarding the privacy of personnel evaluation data it was imperative that this research be performed in a blind fashion. To insure that the research was conducted in such a manner, the following procedures were followed. The questionnaire was administered to the subjects by upper management personnel as a part of the regularly scheduled monthly first-line supervisors meeting. The supervisors supplied their name in the space provided on the front page of the questionnaire. The supervisors then completed the questionnaire and returned it to the manager. The next step was for a designated manager, with access to the performance appraisal records, to record each subject's current overall performance appraisal rating in the red box located in the upper right hand corner of the questionnaire (see Appendix A). Once this process had been completed for all the subjects, the upper tab of the questionnaire containing the name of the subject was removed from the questionnaire. The information

on these slips containing the subject's name was kept by company management. Since the researcher did not possess the master list of subjects, the research data collected remained single-blind. The anonymous questionnaires were then returned to the researcher for data processing and analysis.

#### Dependent Variable

The dependent variable for this study was the first-line supervisor's current total performance appraisal rating. This measure was extracted from the performance assessment which was made by each supervisor's immediate superior at the end of each goal-setting cycle. The performance appraisal cycle lasted for a period of 12 months. Goals were established by a supervisor, working with the superior, at the beginning of the 12 month period. The performance appraisal was made at the end of the 12 month period. At that time a new performance appraisal cycle began.

Each supervisor was ranked for his total performance on an ordinal level scale from 1 to 4. A rating of 1 was the lowest possible rank and represented unsatisfactory performance by the supervisor. A rating of 4 was the highest possible and represented superior performance. The actual overall numerical rating was extracted from the performance appraisal and used as the dependent variable criterion measure.

The total or composite performance appraisal rating was based upon the evaluation of those predetermined goals established

between the superior and subordinate during the beginning of the goal setting cycle. These goals were established to meet those aspects of each supervisor's specific job responsibilities and the goals were reflective of the following characteristics: volume of work, quality of work, communications, planning/organizing, subordinate development, affirmative action/equal opportunity compliance, and safety. Thus, the overall performance appraisal rating was an average rating of each of these component goals.

#### Job Performance Criterion Measure

The criterion measure selected for use as the measure of effectiveness for management training was the employee's total performance appraisal rating. This measure of success was selected because the ultimate goal of management training is to improve the performance of the employee once he has returned to his job (Sullivan, 1970). Hill (1980) and McConkey (1974) point out that job performance should be the criterion of success in evaluating management training and development. Putman (1980) reinforces the concept of using job performance as the criterion of determining management training success. Too often, he claims, management training is evaluated by means of an academic research paradigm. Putman (1980) maintains that management training evaluation ought to be much more pragmatic, that is, measured by the employee's performance on the job, not by the ability of the trainee to reiterate what was presented during training on a cognitive paper and pencil test.

Since the objective of a performance evaluation is to determine an employee's overall job performance, this measure was selected as the criterion measure for evaluating the effectiveness of an employee's management training.

#### Independent Variable

The independent variable for this study was the amount of management training that supervisors had participated in during their last 12 month performance appraisal cycle. The independent variable was quantified by the ordinal level number representing the number of company-sponsored management/supervisory training programs attended and completed by the individuals.

#### Predictor Variables

Data were collected on the predictor variables (co-variables) identified in the review of the literature as associated with management success. These predictor variables were: age, years of supervisory experience, formal education level, self development, prior management training, and professional society participation. The predictor variables, their associated criterion measure(s) and the computer coding scheme are further discussed in Appendix C.

#### Data Preparation

Once all of the questionnaires were returned to the researcher the data were punched onto standard 80 column computer cards. This procedure allowed for data analysis subprograms, presented in the Statistical Package for the Social Sciences (SPSS), to be employed for the purpose of data analyses (Nie, Hull, Jenkins

Steinbrenner, & Bent, 1975). Appendix D describes the detailed descriptive statistics compiled as a result of the initial SPSS analysis.

#### Statistical Analyses of the Data

This study utilized data collected in actual work settings. To avoid contamination by extraneous variables, resulting in the possibility of a threat to internal validity (Sax, 1979), this study employed statistics that until recently could not be easily calculated (Kim, 1978). The use of multivariable statistical methods allows researchers to understand the complex and latent relationships which exist among a group of extraneous variables whose measurement may be of a low mathematical level (Comrey, 1973; Kleinbaum & Kupper, 1978). Multivariable statistical techniques are a valuable tool for the researcher conducting social-behavioral research where measures are difficult to gather and where behavior may be influenced by a number of variables (Feinberg, 1978; Kleinbaum & Kupper, 1978; Myers, 1979; Nie et al., 1975).

The analyses of data were performed utilizing the SPSS subprogram DISCRIMINANT. Specifically, options one, five, and eight of the SPSS subprogram DISCRIMINANT were used. Option one pertains to the inclusion of missing data. It causes the subprogram to include all cases in the calculations necessary to perform the statistical operations regardless of any missing data. Because each questionnaire was filled out completely (i.e. 100%) this option actually was not necessary because there were no



missing data. Option five instructed the computer to print the classification results table. This table indicates the number of cases in each group and the percent correct classifications for the known groups. Option eight provides a separate graphic plot for each group, indicating group membership for the various dependent variable groups (Klecka, 1975).

Statistics that were included in the DISCRIMINANT subprogram were SPSS statistic values one, two and six. Statistic one provided for the means of each of the predictor variables to be printed for each dependent variable group. Statistic two provided for the standard deviations of the predictor variables to be printed for each dependent variable group.

Statistic six provided for the univariate  $F$  ratio for each independent and predictor variable to be printed. This statistic is a one-way analysis of variance test for the equality of group means on each individual variable. The data provided by the use of statistic six were used in the evaluation of the primary and secondary research questions. Statistic six provided a Wilks' lambda, equivalent  $F$  ratio and significance level for each of the independent and predictor variables (Klecka, 1975).

The analyses of the data in Chapter 4 are reported in two parts. The first part is equivalent to the interpretation phase of discriminant analysis. The second part is equivalent to the classification phase of discriminant analysis.

The first part of the data analyses evaluated whether

management training (the independent variable) and entire set of predictor variables were statistically capable of differentiating between the various levels of managerial performance (the dependent variable) (Huck, Cormier, & Bounds, 1974). This evaluation was performed in the following manner. A mean vector was calculated for each criterion level of the dependent variable. Each mean vector contains as many elements as there are predictor and independent variables (Huck et al., 1974).

The evaluation of the mean vector of each dependent variable level for each independent and predictor variable utilized the Wilks' lambda test. Wilks' lambda is a multivariate measure of group differences between several predictor variables and a dependent variable. The measure of Wilks' lambda is inverse and its values range between 0 and +1.0. Thus, a calculated lambda value of near 0 detects a high degree of discrimination between predictor variable group means and the dependent variable criterion levels. A Wilks' lambda of +1.0 denotes that group means of an independent variable are identical (Klecka, 1980).

To test the significance of the Wilks' lambda the calculated lambda value was converted into its equivalent  $F$  value as part of the SPSS subprogram DISCRIMINANT. The exact significance level was also calculated and printed as a result of the DISCRIMINANT subprogram (Huck et al., 1975; Klecka, 1980; Klecka, 1975).

The second part of the data analyses contained the classification phase of discriminant analysis. In part two of the data analyses

the forward stepwise technique was used to generate the classification discriminant function.

In the forward stepwise method the independent variable and predictor variables are selected for entrance into the discriminant function by meeting specific statistical criteria (Klecka, 1975). Since the combined significance level of the discriminant function was significant at the .05 level a discriminant function prediction equation was generated. The development and evaluation of this prediction equation is contained in the second part of the data analyses in Chapter 4.

The advantage of the stepwise technique is that frequently the independent and predictor variables contain superfluous information regarding group differences. The stepwise procedure allows for a reduced set of variables to be found which best predicts differences among the criterion groups as based upon explainable variance (Klecka, 1975).

The variable accounting for the greatest amount of variance in the dependent variable is entered into the discriminant function first. Variables are then individually entered into the function in the order in which they explain the greatest amount of the remaining variance (Klecka, 1975).

The forward stepwise procedure, generating the discriminant function, was used in the second part of the statistical analyses, that is, when the classification (or prediction) phase of the statistical analyses began.

## CHAPTER 4

### PRESENTATION AND ANALYSES OF THE DATA

#### Introduction

The two primary phases of discriminant function analysis are the interpretation phase and the classification phase. The interpretation phase allows for analyses of the discriminant variables in terms of how well the independent and predictor variables discriminate between the dependent variable criterion groups. The classification phase comes after interpretation of the discriminant variables. The result of the classification phase of discriminant analysis produces a discriminant function equation which allows a researcher to classify an individual into a respective dependent variable criterion group (Klecka, 1980).

The data analyses for this study are presented in two parts. The first part is associated with the interpretation phase of discriminant analysis. During this part the primary and secondary research questions are answered. The second part is associated with the classification phase of discriminant analysis. During part two the discriminant function generated by SPSS subprogram DISCRIMINANT is evaluated and a prediction equation is developed for the classification of subjects into predicted criterion groups.

#### Interpretation of Data

The data gathered from the 23 subjects participating in this research endeavor were appropriately coded and punched onto

computer cards in order to perform the discriminant analysis. Appendix D contains the descriptive statistics which have been calculated as a result of the initial SPSS analysis. There were no missing data from any of the 23 completed questionnaires.

The data presented in Table 1 summarizes the results of the interpretation phase of the discriminant analysis and were generated as a result of statistic six being included in the DISCRIMINANT subprogram. The analysis of this table allows for the research questions generated in Chapter 1 to be answered. As shown in Table 1, a Wilks' lambda is generated for each discriminant variable. Wilks' lambda evaluates the mean vectors of each predictor variable by each dependent variable criterion group.

The Wilks' lambda is a measure of discrimination. Values of lambda which are close to 0 indicate high discrimination between the dependent variable criterion groups for each independent and predictor variable. Values of lambda close to 1 indicate low discrimination between the criterion groups of each independent and predictor variable. The Wilks' lambda value for each variable within Table 1 has been transformed into an approximate F value. Then, as in the analysis of variance and co-variance the exact significance level of the F value was determined. This significance level was used to answer each of the following primary and secondary research questions, which were originally generated in Chapter 1.

Table 1  
Statistical Data Generated for Each Independent and Predictor Variable  
Within the Interpretation Phase of the Discriminant Analysis

Var. no.	Variable	Wilks' lambda	F	Significance <sup>a</sup>
1	training attended	.9999	.0008	.9766
2	training completed	.9992	.0168	.8980
3	previous training	.9174	1.890	.1837
4	years experience within	.9672	.7121	.4083
5	years experience elsewhere	.9838	.3451	.5632
6	formal education level	.8572	3.496	.0755
7	age	.9004	2.322	.1425
8	adult education participation	A CONSTANT	-----	-----
9	continuing education participation	.8363	4.109	.0555
10	correspondence study	A CONSTANT	-----	-----
11	professional society involvement	.9959	.0861	.7720
12	number of journals read	.9954	.0966	.7590

<sup>a</sup>based upon 1 and 21 degrees of freedom

### Evaluation of the Research Questions

1. Is there a significant relationship between the number of organizational management training programs attended and managerial performance?

This research question evaluates the relationship between those management training programs attended during the 12 month period prior to each supervisor's last performance appraisal.

The Wilks' lambda was calculated to be .9996. This is equivalent to an  $F$  ratio of .0008. The probability of obtaining an  $F$  this large by chance is .9766. Thus, at the .05 level, there is no significant relationship between management training attended and managerial performance.

2. Is there a significant relationship between the number of management training courses completed and managerial performance?

This research question evaluates the relationship between the number of management training courses completed during the 12 month period prior to each supervisor's last performance appraisal and the performance appraisal rating.

The Wilks' lambda was calculated to be .9992. This is equivalent to an  $F$  ratio of .0168. The probability of obtaining an  $F$  this large by chance is .8980. Thus, at the .05 level, there is no significant relationship between management training completed and managerial performance.

3. Is there a significant relationship between the number of management training programs attended prior to those taken

during the manager's last performance appraisal cycle and managerial performance?

The Wilks' lambda calculated for this research question was .9174. This is equivalent to an  $F$  ratio of 1.890. The probability of obtaining an  $F$  this large by chance is .1837. Thus, at the .05 level there is no significant relationship between years of experience elsewhere and managerial performance. Within the classical research paradigm, the null hypothesis (zero coefficient) cannot be rejected. It should be observed, however, that the .18 probability level still strongly suggests that some underlying relationship does exist.

4. Is there a significant relationship between years of managerial experience within the company and managerial performance?

The Wilks' lambda calculated for this research question was .9672. This is equivalent to an  $F$  ratio of .7121. The probability of obtaining an  $F$  this large by chance is .4083. Thus, at the .05 level there is no significant relationship between years of experience within the company and managerial performance.

5. Is there a significant relationship between the years of managerial experience elsewhere and managerial performance?

The Wilks' lambda calculated for this research question was .9838. This is equivalent to an  $F$  ratio of .3451. The probability of obtaining an  $F$  this large by chance is .5632. Thus, at the .05 level there is no significant relationship between years of



experience elsewhere and managerial performance.

6. Is there a significant relationship between formal education level and managerial performance?

The Wilks' lambda calculated for this research question was .8572. This is equivalent to an  $F$  ratio of 3.496. The probability of obtaining an  $F$  this large by chance is .0755. Thus, at the .05 level there is no significant relationship between formal education level and managerial performance. Although the relationship was not found to be significant at the .05 level, the .08 level of significance between formal education level and managerial performance strongly suggests that some underlying relationship does exist.

7. Is there a significant relationship between age and managerial performance?

The Wilks' lambda calculated for this research question was .9004. This is equivalent to an  $F$  ratio of 2.322. The probability of obtaining an  $F$  this large by chance is .1425. Thus, at the .05 level there is no significant relationship between age and managerial performance. Although the relationship was not found to be significant at the .05 level, the .14 level of significance established between age and managerial performance suggests that some underlying relationship does exist.

8. Is there a significant relationship between taking part in work related adult education and managerial performance?

None of the subjects had participated in adult education

programs, thus, this research question could not be answered.

9. Is there a significant relationship between taking part in continuing education and managerial performance?

The Wilks' lambda calculated for this research question was .8363. This is equivalent to an  $F$  ratio of 4.109. The probability of obtaining an  $F$  this large by chance is .0555. Thus, at the .05 level there is no statistically significant relationship between continuing education participation and managerial performance. Although this relationship was not found to be significant at the .05 level, the .055 level of significance between these two variables strongly suggests that some underlying relationship does exist.

10. Is there a significant relationship between taking part in correspondence study and managerial performance?

None of the subjects had participated in correspondence study, thus, this research question could not be answered.

11. Is there a significant relationship between participation in professional society educational activities and managerial performance?

The Wilks' lambda calculated for this research question was .9873. This is equivalent to an  $F$  ratio of .2685. The probability of obtaining an  $F$  this large by chance is .6097. Thus, at the .05 level, there is no significant relationship between participation in professional society educational activities and managerial performance.

12. Is there a significant relationship between the number of professional journals/periodicals read per month and managerial performance?

The Wilks' lambda calculated for this research question was .9954. This is equivalent to an  $F$  ratio of .0966. The probability of obtaining an  $F$  this large by chance is .7590. Thus, at the .05 level there is no significant relationship between the number of professional journals/periodicals read per month and managerial performance.

#### Classification of Data

Prior to collecting the data, multiple discriminant function analysis was selected as the statistical method for evaluating the data. Upon completion of the data collection it was shown that only two of the four possible dependent variable criterion groups were used by the subjects' immediate supervisors in evaluating the subjects' performance. That is, all of the subjects were rated within the two middle categories on the 4-point rating scale. There were no subjects rated a 1 (unsatisfactory) and there were no subjects rated a 4 (superior). As a result of this, a minor change has been made in the statistical program. This change had a slight effect on the remainder of the data analyses.

In the classification phase of discriminant analysis the number of discriminant functions generated is based upon the number of levels in the dependent variable minus 1, or the number

of predictor variables, whichever is smaller. Thus, because there were four possible categories of the dependent variable it was expected that a maximum of three discriminant functions would be generated for classification purposes. Because only two categories of the dependent variable were used the two group (or simple) discriminant function analysis procedure replaced multiple discriminant function analysis. That is, the decision made regarding the classification of subjects into performance categories was based upon a single discriminant function and not through the interpolation of multiple discriminant functions.

In multiple regression analysis the term multiple refers to the use of several predictor variables. In multiple discriminant analysis "multiple" refers to more than two levels of the dependent variable (Huck et al., 1975).

During the stepwise procedure of discriminant analysis the SPSS subprogram instructs the computer to select predictor variables for inclusion in the prediction equation based upon the predictor variables' combined power to discriminate between criterion groups (Klecka, 1980). The stepwise procedure selects variables for inclusion in the prediction equation until the inclusion of a subsequent predictor variable fails to sufficiently contribute to the discrimination ability of the previously selected variables.

Table 2 summarizes the stepwise procedure associated with this study and illustrates that continuing education participation

was first selected to enter the stepwise procedure. Its significance level is .056. In the second step continuing education participation was paired with formal education level to produce a combined effects lambda of .7341, and a significance level of .045. In the third step, continuing education and formal education level were paired with previous management training to produce a combined lambda of .6348 and a significance level of .031.

Table 2  
Variables Selected to Enter the  
Stepwise Discriminant Analysis

Step	Variable name	Variable number	F to enter	Wilks' lambda	Significance
1	continuing education participation	9	4.1087	.8363	.056
2	formal education level	6	2.7848	.7341	.045
3	previous training	3	2.9728	.6348	.031

Further attempts to pair the three selected variables with a fourth variable failed to produce an  $F$  to enter greater than 1.00. As a result, the stepwise procedure was completed with the inclusion of continuing education participation, formal education level, and previous management training experiences.

Although the probability level obtained for the variable of age (.14) was lower than that of the variable of previous management training (.18) the latter was selected for inclusion

in the prediction equation. The criteria for selection into the equation was not based upon probability level alone, but was based upon how much of an additional contribution a variable makes towards explaining total variance, taking into account multicollinearity between variables.

Table 3 reviews the one canonical discriminant function composed of the three stepwise selected variables.

Table 3  
Statistical Analysis of the Discriminant Function

Discriminant function	Canonical correlation	Wilks' lambda	Chi- square	Significance
1	.604	.6348	8.861	.031

The canonical correlation of this discriminant function was .604. Canonical correlation is a measure of relationship between the criterion groups and the discriminant function. A canonical correlation of 0 represents no relationship and a correlation of 1 represents a high degree of correlation (Klecka, 1980). The Wilks' lambda was .6348 and the approximate chi-square of Wilks' lambda was 8.861. The chi-square approximation of lambda is used in evaluating the discriminant function opposed to an approximate  $F$  (Klecka, 1980). The probability of obtaining a chi-square value this large by chance is .031. Thus, at the .05 level the discriminant function was significant.

Table 4 presents the standardized and unstandardized discriminant function coefficients and the unstandardized coefficient constant which were generated as a result of the discriminant analyses.

Table 4  
Derived Discriminant Function Coefficients  
and Unstandardized Constant

Variable name	Variable number	Unstandardized coefficient	Standardized coefficient
previous training	3	-.75075	-.63615
formal education level	6	.55621	.71921
continuing education	9	3.17563	.61982

Note. The unstandardized coefficient constant is -8.3151.

The unstandardized coefficient is the value used when calculating a discriminant score (predicted score) for a subject. In general, to calculate a discriminant score for an individual the following formula is used (Klecka, 1980, p. 24).

$$D = K + d_1X_1 + d_2X_2 + d_3X_3 \dots + d_kX_k$$

Where:

D = the discriminant (or predicted score)

K = the unstandardized coefficient constant

$d_1$  = the unstandardized discriminant coefficient for variable 1

$X_1$  = the actual value or score for an individual on variable 1

To derive a discriminant score for the purpose of classification in this research study the specific discriminant equation appears as:

$$D = K + d_1X_1 + d_2X_2 + d_3X_3$$

Where:

D = the discriminant score

K = the unstandardized coefficient constant

$d_1$  = the unstandardized coefficient for previous training

$d_2$  = the unstandardized coefficient for formal education level

$d_3$  = the unstandardized coefficient for continuing education

$X_1$  = the actual coded value obtained for previous training

$X_2$  = the actual coded value obtained for formal education level

$X_3$  = the actual coded value obtained for continuing education

The resulting discriminant score is then compared to the group centroids which are displayed in Table 5.

Table 5  
Group Centroids of the Dependent Variable Criterion Groups

Performance appraisal	Value label	Group centroid
2	satisfactory	-.38197
3	above satisfactory	1.37509



Then, the assignment of a subject to a performance classification is based upon the criterion of closeness to a group centroid (Kerlinger & Pedhazur, 1973).

The standardized discriminant coefficients shown in Table 4 aid in the ability to determine the relative importance of a variable in the discriminant function (Klecka, 1980). "Unsigned, the values indicate which variables contribute the most to the discrimination ability of the function. The sign indicates whether the variable is making a positive or negative contribution" (Klecka, 1975, p. 443).

Table 6 indicates the classification results when the discriminant function prediction equation was used to predict the classification of the 23 subjects used in developing the prediction equation.

Table 6  
Classification Results of the Prediction Equation  
Based Upon the 23 Subjects in the Population

Actual group	No. of cases	Predicted group membership	
		2	3
2-satisfactory	18	15 (83.3%)	3 (16.7%)
3-above satisfactory	5	1 (20.0%)	4 (80.0%)

Note. 82.16% of the cases were correctly classified

As Table 6 indicates, the discriminant function prediction equation which was generated and tested on the population from

which the equation was derived was 82.16% successful. That is, the equation correctly classified 83.3% of the satisfactory managers as satisfactory, and correctly classified 80% of the above satisfactory managers as above satisfactory. These two success rates were then pooled, establishing an overall success rate of 82.16%.

## CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONSSummary

The data from this research project were analyzed in two parts. The first part was an assessment of the relationship between participation in management training and other predictor variables and managerial performance. The second part was an evaluation of the discriminant function, for the purpose of determining whether a significant management performance prediction equation could be developed employing the independent and predictor variables.

A beneficial aspect of this part of the analysis was that the relationship between several independent and predictor variables and a dependent variable could be concurrently ascertained (Kleinbaum & Kupper, 1978). The statistical techniques employed thus permitted an assessment of the relationship between participation in management training programs (the independent variable) and managerial performance (the dependent variable), as measured by the subjects' current total performance appraisal ratings. The strength of this type of analysis allowed for the inclusion of the effects of the moderating (predictor) variables. Thus, this type of analysis compensated for past criticisms of the evaluation of management training; that is, that known moderating variables are not included in the analysis of training effectiveness (Clegg, 1978) and that the criterion measure for

the effectiveness of management training should be on-the-job performance (Hill, 1980; McConkey, 1974).

A summary of the results of the first part of the data analyses are included below (the significance level is .05).

1. Is there a relationship between the number of organizational management training programs attended and managerial performance?

The evaluation of this primary research question showed that there was no significant relationship ( $p = .98$ ) between the amount of management training attended among the two performance levels of the subjects. This research question evaluated the amount of training attended by the subjects during the past 12 months of their current performance appraisal cycle. The evaluation of this research question tends to confirm the past findings regarding the effectiveness of management training on managerial performance. That is, many individuals writing and researching about management training indicate that the effect of management training on actual job related performance may be minimal (Campbell et al., 1970; Daly, 1976; Dyer, 1978; Lien, 1979).

2. Is there a relationship between the number of management training courses completed and managerial performance?

This research question was designed to evaluate the relationship between the amount of management training completed and managerial performance. The difference between this question and the previous question was that this question only evaluated completed training

programs. Thus, the previous research question included information about training that participants may have started but for some reason were unable to complete, or any training that was currently in progress but not yet completed. The results of this research question indicate that there was no significant relationship ( $p = .90$ ) between the amount of management training completed and managerial performance.

3. Is there a relationship between the number of management training programs attended prior to those which were taken during a manager's last performance appraisal cycle and managerial performance?

The criterion period for the evaluation of research questions one and two, as previously stated, was the 12 month period of time immediately prior to the subjects' last performance appraisal. The purpose of this research question evaluated the relationship between pre-criterion training attended and managerial performance. The results of this research question indicate that there was no significant relationship ( $p = .18$ ) between pre-criterion training and managerial performance. Although this relationship was not found to be significant at the .05 level, the .18 level of significance between these two variables suggests that some underlying relationship does exist. It is also worth noting that in the evaluation of this question, the lower performing group of subjects had participated in more pre-criterion training than the higher performing group of subjects. Thus, there appeared to be an inverse relationship

between pre-criterion training and managerial performance. However, neither the time frame of this pre-criterion training, nor the sponsor of this training could be determined. As a result of this shortcoming, no further analysis could be drawn, however, the results of this question confirm the findings of Beeland in 1976. Beeland's study of 69 first-line supervisors showed an inverse relationship between participation in in-house management training and managerial performance. One must be cautious of drawing such a conclusion regarding this research study because of the limited knowledge about the nature of this pre-criterion training.

4. Is there a relationship between years of managerial experience within the company and managerial performance?

The evaluation of this research question indicates that there was no significant relationship ( $p = .41$ ) between years of managerial experience within the company and managerial performance. These findings contradict the literature which suggests that years of managerial experience is positively correlated to managerial success (Carlisle, 1976; 'Street-smart', 1979). In fact, the actual mean number of years experience is lower for those supervisors who were rated as better overall managers (see Appendix D).

5. Is there a relationship between years of managerial experience within other organizations and managerial performance?

The evaluation of this research question indicates that

there was no significant relationship ( $p = .56$ ) between years of managerial experience elsewhere and managerial performance.

Thus, whether managerial experience is obtained within the organization or elsewhere is unrelated to managerial performance.

6. Is there a relationship between formal education level and managerial performance?

The evaluation of this research question indicates that there was no significant relationship ( $p = .08$ ) between formal education level and managerial performance. Although this relationship is statistically insignificant at the .05 level there seems to be a practical significance about the relationship between formal education level and managerial performance. In this study, the better performing managers had higher levels of formal education than the lower performing managers. Thus, the relationship discovered is positive. These findings are consistent with the findings of Bassett (1974), Dean (1976), Herbert (1977), and Miner (1965) who have shown that formal education level is a factor positively related to managerial success. It is interesting to note that the mean length of formal education (11.78 years) completed by the lower performing managers is less than the amount of time required for high school graduation, while the mean length of formal education (13.0 years) for the better performing managers is beyond high school graduation.

7. Is there a relationship between age and managerial

performance?

The evaluation of this research question indicates that there was no significant relationship ( $p = .14$ ) between age and managerial performance. Although statistically insignificant, there appears to be a correlation that has practical significance. Examining the descriptive statistics for this research question indicates that the strength of this relationship is inverse. That is, the mean age (46.22 years) for the lower performing managers is higher than the mean age (39.8 years) of the higher performing managers.

Thus, at the practical level the findings are consistent with those of Birren (1964), Kirchner (1958), Miner (1974), and Taylor (1975). These researchers have found age to be a factor related to managerial performance. However, their findings indicate that the relationship is not simple. These studies suggest that age affects performance in a number of ways, sometimes positively and sometimes negatively. However, in this study age was shown to be inversely related to overall managerial performance.

8. Is there a relationship between taking part in work-related adult education programs and managerial performance?

The relationship between participation in adult education and managerial performance could not be determined because the response to this item by subjects was a constant (no participation by any subjects).



9. Is there a relationship between taking part in continuing education and managerial performance?

The evaluation of this research question indicates that there was no statistically significant relationship ( $p = .055$ ) between participation in continuing education and managerial performance. Although this relationship was not found to be significant at the .05 level, the .055 level of significance suggests that some underlying relationship does exist. As Erdos (1967) and Pearse (1974) suggest, this form of self development is a factor related to managerial performance. As the most significant factor related to managerial performance in this study, this study tends to confirm the findings of Erdos and Pearse.

10. Is there a relationship between taking part in correspondence study and managerial performance?

The relationship between participation in correspondence study and managerial performance could not be determined because the response to this item by subjects was constant (no participation by any subjects).

11. Is there a relationship between participation in professional society activities and managerial performance?

The evaluation of this research question indicates that there was no significant relationship ( $p = .77$ ) between participation in professional society educational activities and managerial performance. These findings are contradictory to those authors suggesting that professional society involvement is related to

managerial performance (Houle, 1980; Lee, 1966; Vermilye, 1977).

12. Is there a relationship between reading professional periodicals and journals and managerial performance?

The evaluation of this research question indicates that there was no significant relationship ( $p = .76$ ) between the amount of professional journals/periodicals read per month and managerial performance. Houle (1980), Lee (1966), and Vermilye (1977) suggest that as a self development activity, professional reading is a factor related to managerial performance. However, the findings of this study fail to confirm those prior findings.

In part two of the data analyses the one discriminant function generated was evaluated to determine if a prediction equation could be developed for the purpose of classifying managers by a performance rating. The stepwise discriminant function procedure produced a three variable discriminant function equation significant at the .05 level.

The three variables included in the equation were:

(a) continuing education participation, (b) present educational status, and (c) previous management training experiences.

The application of the prediction equation to each individual subject taking part in the research project was 82.61% effective in classifying the subjects into their respective performance appraisal category.

The use of such a prediction tool should be judicious. First, it is important to remember that this study was not

performed as true experimental research. Thus, the results of the study are of a relational, and not cause and effect nature. Second, because of the exploratory nature of this study, the use of the prediction equation should be limited. The prediction equation developed in this study identified three of the best predictors available from a possible field of 12 variables. An increase in the number of variables in the field of selection may have resulted in a different set of predictor variables being selected for inclusion in the prediction equation. However, because of the practical implications of performing such predictive studies it is difficult to take additional predictor variables into consideration. Thus, such an equation should not be used as the sole basis for making decisions regarding a person's future performance (Kerlinger & Pedhazur, 1973).

While the primary aim of scientific investigation is to establish theory, replication of such investigation is imperative. Once a theory is established a meaningful pattern of interrelations among independent variables can be created. As a result, a systematic pattern of phenomena emerges (Kerlinger, 1973).

Besides establishing a theory, prediction is an aim of scientific investigation. Prediction, however, only becomes possible through the establishment of theory through replication and validation of scientific inquiry. Thus, generalizable predictive validity is contingent upon establishing theory (Kerlinger, 1973).

The results of this study need to be replicated in a number

of different settings before such an equation can serve as a truly useful, generalizable and valid tool for predicting first-line supervisor performance.

### Conclusions

The primary problem that was investigated in this research was to determine the relationship between participation in company-sponsored management training programs and subsequent managerial performance.

Past literature and research regarding this subject suggest that in terms of performance improvement as the criterion of success, management training may be ineffective at best (Beeland, 1976; Clegg, 1978; Daly, 1976; Dyer, 1978; Lien, 1979; Miles & Biggs, 1979).

The evaluation of the primary research questions included in part one of the data analyses confirm the findings in the literature. That is, this study indicates that there is no significant or practical relationship between participation in management training programs and managerial performance among the selected industrial first-line supervisors.

While behavioral change is the intended outcome of management training, research indicates that there may be two primary causes for the lack of relationship between management training and job performance. These are: (a) management training frequently does not properly utilize behavioral change techniques necessary for the effective transfer-of-training of management skills from

the learning environment to the work environment (Miles & Biggs, 1979; Goldstein & Sorcher, 1974) and (b) management training content may not be based upon a needs analysis reflecting the real need of the training participants (Campbell et al., 1970; Goldstein & Sorcher, 1974; Jackson & Keaveny, 1980).

#### Recommendations for Further Research

1. Research studies utilizing this research design should be performed in other organizations in order to replicate and substantiate the results of this study.
2. This study should be replicated using larger sample sizes with the same target population (first-line supervisors).
3. This study should be replicated incorporating other levels of managers as subjects.
4. A study similar to this should be performed incorporating pre and post treatment measures on subjects' managerial performance.
5. Further research is necessary to establish the cost effectiveness of various forms of management training for the purpose of justifying training programs to organizations' top level management.
6. Validation studies should be performed on the performance appraisal systems used within industrial organizations.
7. Future studies should be concerned with how certain predictor variables are related to managerial performance.
8. The prediction equation developed in this study should be evaluated for its application and effectiveness in other supervisory and managerial settings.

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APPENDIX A  
Questionnaire

NAME: \_\_\_\_\_

UNIVERSITY OF NORTHERN IOWA  
DEPARTMENT OF INDUSTRIAL TECHNOLOGY

(Office use  
only)

GENERAL DIRECTIONS: Fill in your name in the space above marked "NAME." Please respond to all items on both sides of this form. Be as honest and accurate as possible. All of your responses will be kept confidential and your name will be removed from the form before the analysis of the data. No one but the administrator will know which form you completed. Upon completion place the form back in the envelope and return it to the administrator. THANK YOU.

☐

1. How many management/supervisory training courses, seminars or workshops have you attended during the 12 month period immediately prior to your last performance appraisal?

☐

\_\_\_\_\_

2. Of those management/supervisory training courses, seminars or workshops identified in number 1 above, how many did you complete?

☐

\_\_\_\_\_

3. How many management/supervisory training courses, seminars and workshops have you attended *PRIOR* to those listed above?

- ☐ 12 or more  
☐ 5 to 11  
☐ 1 to 4  
☐ 0

☐

4. How many years of managerial/supervisory experience do you have with *this* company?

☐

\_\_\_\_\_

(OVER)

5. How many years of managerial or supervisory experience have you had with *other* organizations?

9	10

6. What is your present educational status?

- ☐ High school graduate  
☐ Associate degree completed  
☐ Bachelor's degree completed  
☐ Other: Specify \_\_\_\_\_

11	12

7. What is your age?

13	14

8. Have you recently, or are you currently, participating in any of the following activities which are related to your present job?

- ☐ Adult evening classes (working toward a degree)  
☐ Continuing education (non-credit or CEU credit)  
☐ Correspondence courses

15	16	17

9. Do you participate, as a student, in instructional or educational activities sponsored by professional societies?

- ☐ Yes (5 or more per year)  
☐ Yes (3 or 4 per year)  
☐ Yes (1 or 2 per year)  
☐ No

18

10. How many professional journals/periodicals do you regularly read each month?

- ☐ 5 or more  
☐ 3 to 4  
☐ 1 to 2  
☐ 0

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APPENDIX B

## Instruction Sheet for Questionnaire Administration



INSTRUCTIONS FOR QUESTIONNAIRE ADMINISTRATION

1. Present one copy of the questionnaire to each first-line supervisor and ask them to fill it out. Reassure each person that their identity will be anonymous. Have the supervisor fill out the questionnaire immediately and then return the form to you.
2. After all supervisors have filled out their questionnaire, obtain each person's current performance appraisal rating and place their number in the red block marked number "1" in the upper right corner of the questionnaire. (1 = low, 4 = high)
3. Remove each person's name from the questionnaire by removing the name slip at the dotted line. Keep these name slips in a secure place for documentation, if needed, or type a list containing the name of each subject completing a questionnaire. This list should be kept by company personnel.
4. Keep a record of the number of supervisors who do not fill out the questionnaire. It is important that as many supervisors as possible complete the questionnaire to eliminate selectivity bias from occurring. Therefore, if any supervisors initially prefer not to fill out a questionnaire, reassure the person that the information will remain anonymous and confidential and that the purpose of the study is to determine how effective their supervisory training has been, not to evaluate supervisors.
5. If you have any further questions regarding the administration or completion of this instrument, call me (anytime) at: 273-2509 (work) or 266-0126 (home).

APPENDIX C

Predictor Variables, Their Related Criterion  
Measure(s), and the Computer Coding System

<u>Predictor Variable</u>	<u>Criterion Measure</u>	<u>Coding</u>
1. age	age of employee in years	actual age
2. formal education level	high school graduate	12
	Associate degree holder	14
	Bachelor degree holder	16
	other	years of education
3. years of managerial experience within the company	actual number of years of experience	years of education
4. years of managerial experience obtained elsewhere	actual number of years previous experience	years of experience
5. previous management training experience	number of previous management training experiences	12 or more = 4 5 to 11 = 3 1 to 4 = 2 0 = 1
6. self-development	I. participating in educational activities	
	degree oriented adult evening classes	1 = No 2 = Yes

<u>Predictor Variable</u>	<u>Criterion Measure</u>	<u>Coding</u>
6. self-development (contd.)	Adult Education (degree)	1 = No 2 = Yes
	continuing education (non-degree)	1 = No 2 = Yes
	correspondence course	1 = No 2 = Yes
	II. participation in professional society activities:	
	Yes (5 or more/year)	4
	Yes (3 or more/year)	3
	Yes (1 or more/year)	2
	No	1
	III. number of professional journals/periodicals regularly read per month:	
	5 or more	4
	3 or 4	3
	1 or 2	2
	0	1

APPENDIX D

## Descriptive Statistics of Data Analysis

Descriptive Statistics of Data Analysis

<u>PA</u>	<u># of cases</u>	<u>label</u>
2	18	satisfactory
3	<u>5</u>	above satisfactory
TOTAL	23	

Dependent variable criterion measure: number of cases by performance appraisal (PA) category.

<u>PA</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
2	.61	.69
3	<u>.60</u>	<u>.89</u>
TOTAL	.608	.72

QUESTION 1: Mean ( $\bar{X}$ ) and standard deviation (SD) of number of management/supervisory training courses attended by subjects for each performance appraisal category.

<u># of courses attended</u>	<u>freq. PA = 2</u>	<u>freq. PA = 3</u>	<u>grand total</u>
0	9	3	12
1	7	1	8
2	<u>2</u>	<u>1</u>	<u>3</u>
TOTAL BY GROUP	18	5	23

QUESTION 1: Frequency distribution of the number of management/supervisory training courses attended by subjects for each performance appraisal category.

<u>PA</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
2	.55	.61
3	<u>.60</u>	<u>.89</u>
TOTAL	.56	.66

QUESTION 2: Mean and standard deviation of number of management/supervisory training courses completed by subjects for each performance appraisal category.

<u># of courses completed</u>	<u>freq. PA = 2</u>	<u>freq. PA = 3</u>	<u>grand total</u>
0	9	3	12
1	8	1	9
2	<u>1</u>	<u>1</u>	<u>2</u>
TOTAL BY GROUP	18	5	23

QUESTION 2: Frequency distribution of the number of management/supervisory training courses completed by subjects for each performance appraisal category.

<u># of courses</u>	<u>freq. PA = 2</u>	<u>freq. PA = 3</u>	<u>grand total</u>
12 or more	1	0	1
5 to 11	7	1	8
1 to 4	9	2	11
0	<u>1</u>	<u>2</u>	<u>3</u>
TOTAL BY GROUP	18	5	23

QUESTION 3: Frequency of pre-criterion period management/supervisory training courses attended by subjects.

<u>PA</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
2	7.72	4.70
3	<u>5.80</u>	<u>3.56</u>
TOTAL	7.30	4.47

QUESTION 4: Mean and standard deviation of number of years of managerial/supervisory experience of subjects within this company.

<u>PA</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
2	3.83	5.73
3	<u>2.20</u>	<u>4.38</u>
TOTAL	3.47	5.41

QUESTION 5: Mean and standard deviation of number of years managerial/supervisory experience of subjects with other organizations.

<u>educational status</u>	<u>freq. PA = 2</u>	<u>freq. PA = 3</u>	<u>grand total</u>
high school incomplete	4	1	5
high school graduate	12	2	14
Associate degree completed	0	0	0
Bachelor's degree completed	0	1	1
other	<u>2</u>	<u>1</u>	<u>3</u>
	18	5	23

QUESTION 6: Frequency response of subjects' formal education status by performance appraisal rating.



<u>PA</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
2	46.22	7.51
3	<u>39.80</u>	<u>11.16</u>
TOTAL	44.82	8.58

QUESTION 7: Mean and standard deviation of subjects' age by performance appraisal rating.

<u>present ed. status</u>	<u>freq. PA = 2</u>	<u>freq. PA = 3</u>	<u>grand total</u>
adult evening classes	0	0	0
continuing ed. classes	0	1	1
correspondence study	0	0	0
non-participant.	<u>18</u>	<u>4</u>	<u>22</u>
TOTAL	18	5	23

QUESTION 8: Participation of subjects in adult education, continuing education or correspondence study by performance appraisal rating.

<u>prof. society involvement</u>	<u>freq. PA = 2</u>	<u>freq. PA = 3</u>	<u>grand total</u>
5 or more activities/year	0	0	0
3 or 4 activities/year	0	0	0
1 or 2 activities/year	1	0	1
0	<u>17</u>	<u>5</u>	<u>22</u>
TOTAL	18	5	23

QUESTION 9: Frequency of subjects' participating as a student in educational activities sponsored by professional societies.

<u># of journals read/month</u>	<u>freq. PA = 2</u>	<u>freq. PA = 3</u>	<u>grand total</u>
5 or more	2	0	2
3 or 4	1	0	1
1 or 2	10	4	14
0	<u>5</u>	<u>1</u>	<u>6</u>
TOTAL	18	5	23

QUESTION 10: Number of journals/periodicals read monthly by  
subjects according to performance appraisal rating.

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